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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/750,249	12/31/2003	Kwan Joo Ko	20063/10007	8849

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EXAMINER	
DANG, PHUC T	

ART UNIT	PAPER NUMBER
2818	

DATE MAILED: 02/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/750,249	KO, KWAN JOO	
	Examiner	Art Unit	
	PHUC T. DANG	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-6* is/are rejected.

7)☒ Claim(s) *3 and 7* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *032504*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Oath/Declaration

1. The oath/declaration filed on December 31, 2003 is acceptable.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

3. The office acknowledges receipt of the following items from the applicant:

Information Disclosure Statement (IDS) filed on March 25, 2004.

Specification

4. The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-2 and 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Westwater et al, hereinafter "Westwater" (U.S. Patent No. 6,130,143) in view of Kim (U.S. Patent No. 6,767,771 B2).

Westwater discloses a method of forming quantum dots in a semiconductor device, the method comprising:

adsorbing metal clusters (12, Fig. 2A) on a silicon substrate 911, Fig. 2B);

growing silicon (13, Fig. 2D) by heating the substrate on which the metal clusters are adsorbed;

removing the metal clusters (12a, Figs. 2A and 3A).

The metal clusters adsorbed on the silicon substrate by controlling density is considered to be obvious, since any material may adsorb much or less depending on the density applied in the process. Thus, it would have been obvious to one having ordinary skilled in the art at the time the invention was made to modify the teaching of Westwater in controlling the density for a purpose of improving a process of forming quantum dots in a semiconductor device.

Westwater discloses all the features of the claimed invention as discussed above, but does not disclose forming a silicon oxide layer on the substrate; and depositing polysilicon on the oxide layer and patterning the polysilicon and the oxide layer.

Kim, however, discloses forming a silicon oxide layer (41, Fig. 10F) on the substrate; and depositing polysilicon (43, Fig. 10F) on the oxide layer and patterning the polysilicon and the oxide layer [Fig. 10F and col. 8, lines 6-9].

It would have been obvious to one having ordinary skilled in the art at the time the invention was made to apply the teaching of Kim to Westwater discussed above such that forming a silicon oxide layer on the substrate; and depositing polysilicon on the oxide layer and patterning the polysilicon and the oxide layer for a purpose of controlling the size of the quantum dots.

Regarding claim 2, Westwater discloses wherein a metal of the metal clusters is selected from the group consisting of gold, silver, and a transition metal [col. 6, lines 18-24].

Regarding claim 4, Westwater disclose wherein the silicon condenses and grows only between the metal clusters and the silicon substrate and nano-line of the silicon is formed vertically on the surface [Figs. 3A-3C].

Regarding claim 5, westwater discloses wherein the size of the metal clusters is between about 5 and 50 nanometers [col. 6, lines 24-27].

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Westwater and Kim in view of Hirai et al., hereinafter "Hirai" (U.S. Patent No. 5,347,140).

Westwater and Kim disclose all the features of the claimed invention as discussed above, but do not disclose the silicon oxide layer is formed by thermal oxidation method.

Hirai, however, discloses the silicon oxide layer is formed by thermal oxidation method [col. 14, lines 13-15].

It would have been obvious to one having ordinary skilled in the art at the time the invention was made to apply the teaching of Hirai to Westwater discussed above such that the

silicon oxide layer is formed by thermal oxidation method for a purpose of controlling the size of the quantum dots.

Allowable Subject Matter

7. The following is a statement of reason for the indication of allowable subject matter:

Claims 3 and 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

None of the Prior Art made of record discloses wherein the silicon is grown by chemical vapor deposition (CVD) method using the metal clusters as a mask as cited in claim 3 and wherein the thermal oxidation method uses 02 gas or NO gas at a temperature of about 800 to 1000°C as cited in claim 7.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuc T. Dang whose telephone number is (571) 272-1776. The examiner can normally be reached on 8:00 am-5:00 pm.

9. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Nelms can be reached on (571) 272-1787. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and After Final communications.

10. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Phuc T. Dang PD

Primary Examiner

Art Unit 2818